MATTHEW ARNO, Ph.D., CHP

EDUCATION

- Ph.D., Health Physics, Texas A&M University, 2002
- M.S., Nuclear Engineering, Massachusetts Institute of Technology, 1994
- B.S., Nuclear Engineering, Massachusetts Institute of Technology, 1994

CERTIFICATIONS

- Certified Health Physicist
- Engineer In Training

EXPERIENCE

January 2001 - present

Senior Health Physicist, Foxfire Scientific, Inc.

- Perform radiation dose assessments and retrospective radiation dose reconstructions in support of litigation. Responsibilities include reconstructing time and motion studies of potentially exposed individuals; determination and reconstruction of source terms for various internal and external exposure pathways; calculation of doses from inhalation, ingestion, external exposure, and radon inhalation for specific commitment period and specific affected organs; communication of results of studies in both written reports and oral deposition/testimony as required.
- Performed dosimetric analysis of proposed waste storage operations for Chem-Nuclear Systems, Barnwell, SC site to evaluate worker and off-site dose rates and annual doses.
- Presently involved in project to reconstruct doses from NORM associated with oil and gas pipe storage and cleaning facilities. Project involved reconstruction of worker doses from inhalation of suspended dusts, ingestion of dusts, radiation exposure from ground contamination, and exposure from contamination oilfield pipes. An expert report in support of ongoing litigation was prepared to document the results.
- Presently involved in project to reconstruct doses from NORM and uranium source and byproduct material associated with uranium mining and milling operations. Project involved reconstruction of doses to both workers and members of the general population from mining, milling, and uranium ore transportation activities. The dose pathways analyzed were inhalation of dusts suspended from ore grinding and transport activities and subsequent transport of the dusts downwind by plume code analysis to the receptors, ingestion of dusts from contaminated foodstuffs, and external exposure from contaminated ground. An expert report in support of ongoing litigation was prepared to document the results.
- Analyzed NORM associated with phosphate mining and beneficiation operations to perform radiation dose assessments.

December 2002 - June 2004

Visiting Assistant Professor, Texas A&M Univ., Dept. of Nuclear Engineering

- Instructor for NUEN 402, Radiation Detection and Isotope Technology Laboratory Course. Class was taught spring semester 2004 (42 students), spring semester 2003 (40 students) and assisted with course spring semester 2001 (27 students). This course covers the theory and application of all types of radiation detectors from the fundamentals of radiation interactions through the particular theory and design of different detectors and their use and application. Duties included independently preparing lecture materials and conducting lectures, preparing and conducting labs, preparing and grading tests, quizzes, homeworks, lab reports, and term projects.
- Instructor for NUEN 476, Environmental Radiation Measurement Laboratory course. This course covers low- and operational-level environmental radiation measurement in the nuclear power, weapons complex, medical, and waste disposal/remediation venues. Topics include: counting room setup, applied counting statistics, sample acquisition and preparation, chemical and radiological analyses, radon measurement, trace element analyses, environmental and occupational radiation field/contamination assessment, radiological accident response, gross alpha and beta determination, sample preparation for chemical separation of elements for alpha and beta counting. Duties included independently preparing lecture materials and conducting lectures, preparing and conducting labs, preparing and grading tests, quizzes, homeworks, and lab reports.
- Investigator on research grant performing testing and sampling of radioactive dust generation, atmospheric dispersion, and doses from cleaning of oil field pipes using the dry rattling process.
- Investigator on research grant to develop Screening Dose Conversion Factors (SCDFs) to estimate acute radiation inhalation exposures from external dose rate measurements using commonly available radiation detection instrumentation.

September 1999 - December 2002

Graduate Teaching/Research Asst., Texas A&M Univ., Dept. of Nuclear Engineering

- Ph.D. research consisted of conducting a probabilistic dose assessment for an Assured Isolation Facility (AIF) for low-level radioactive waste in Texas. Dose assessment analyzed worker and public doses during normal conditions and public doses from accident conditions. Radiation skyshine and streaming were modeled using MCNP to accurately account for complex geometries. Plume code analyses of releases using HOTSPOT were performed to consider all combinations of meteorological conditions to determine the probability of receiving a given dose at any location (including local cities) as a result of an accident.
- Instructor for 5-week “Fundamentals of Health Physics” course conducted in 2001 and 2002, and 2004 by Texas A&M University for Texas Bureau of Radiation Control personnel.
- Instructor for 40-hour RSO courses conducted by Texas A&M University in 2000 and 2001. This course is designed to provide the basic training needed to be an RSO on radioactive materials licenses and covers radiation interactions with matter, radiation

detection and dosimetry, shielding, Texas and NRC regulations, and auditing fundamentals.

- Teaching Assistant for Nuclear Detection & Isotope Technology lab class (NUEN 402). Duties included lecturing on theory and application of radiation detection instrumentation; preparing, conducting, and grading hands-on labs and lab reports; preparing and grading tests, homeworks, and projects.
- Teaching Assistant for Environmental Nuclear Engineering class (NUEN 475) covering environmental aspects of nuclear power, including evaluation of the effects of radiation and radioactivity on the environment and people (workers and the public). Duties included lecturing, preparing and grading tests, homework assignments, and projects.
- Teaching Assistant for Radiological Safety class (NUEN 409) covering radiation interactions with matter, radiation biology, internal and external dosimetry, and radiation monitoring techniques. Duties included lecturing, preparing and grading tests, homework assignments, and projects.

September 1994 - August 1999

Nuclear Safety Analysis Engineer, United States Enrichment Corporation, Paducah Gaseous Diffusion Plant

- Project Manager and Lead Engineer for a $700,000 project to develop a new Safety Analysis Report (SAR) to replace the 20+ year old SAR for the "Paducah Tiger" overpack used to transport UF_6 cylinders. The new SAR updated the safety documentation to meet current regulatory requirements in support of 10 CFR 71 recertification. Received bonus award for timely completion of this project.
- Project Manager and Lead Engineer for a $400,000 project to implement the OSHA 29 CFR 1910.119 Process Safety Management of Highly Hazardous Chemicals standard for the plant, including development of hazard analyses, configuration management and mechanical integrity/ preventive maintenance programs. Developed and wrote procedures implementing these requirements.
- Voting member of the Nuclear Safety Subcommittee of the Plant Operating Review Committee tasked with reviewing all changes to the facility Safety Analysis Report and nuclear criticality safety evaluations.
- Safety Analysis Report chapter author and subject matter expert during development of an initial Safety Analysis Report for NRC certification of the plant under 10 CFR 76. Facilitated the transition of regulatory oversight from the U. S. DOE to the NRC.
- Received "Lockheed Martin Award of Excellence" for exceptional leadership and performance as part of a team formed to provide shift personnel with in-the-field assistance in compliance with Technical Safety Requirements (TSRs, similar to power plant Technical Specifications) during transition to NRC regulatory oversight.
- Performed plant hazard analyses including determination of credible accident scenarios; development of potential source terms and consequences; development, modification, and verification and validation of plume code models; mathematical and computer modeling of plant behavior in accident scenarios; and determination of preventive and mitigative measures in support of SAR development, plant modifications, and as-found conditions.

- Qualified as a senior technical reviewer of USQ Determinations, Operability Evaluations, and Justifications for Continued Operations. Authored several hundred USQ determinations (as required by 10 CFR 76.68, which is similar to 10 CFR 50.59) on a variety of issues including procedure changes, as-found conditions, accident analysis updates, and SAR revisions. Also authored approximately 5 each JCOs and Operability Evaluations on as-found conditions that conflicted with the SAR, TSRs, or other regulatory commitments.
- Interfaced directly with the NRC Resident Inspectors and NRC staff on a weekly basis in response to technical questions on SAR analyses, USQ Determinations, JCOs, and plant operations. The Nuclear Safety Analysis department was responsible for the preparation and maintenance of the accident analysis contained in the plant SAR and the TSRs and thus was a main point of contact for the resident inspectors and inspection team members with questions regarding the SAR and TSRs.
- Served as procedure reviewer for the Nuclear Safety Analysis department during site-wide project to generically upgrade all procedures and as part of the NRC certification reviewing over 2000 procedures over a three-year period.
- Member of multiple engineering design teams for modifications to safety-related equipment. Reviewed and approved mechanical and electrical engineering drawings and schematics. Assisted with development of new and revised procedures related to the modifications. Performed computer modeling and simulation of system behavior during postulated accident scenarios.

PUBLICATIONS AND PRESENTATIONS

- Arno MG, Hamilton IS. Radiation Streaming and Skyshine Evaluation for a Proposed Low-level Radioactive Waste Assured Isolation Facility. Health Phys 85(4):494-499. 2003.
- Arno MG, Kercher J, Cederwall R, Loosmore G. Extension of NCRP 129 to Short-lived Radionuclides. Accepted for publication in *Health Physics*.
- Hamilton IS, Arno MG, Rock JC, Berry RO, Poston JW, Cezeaux JR, Park JM. Radiological assessment of petroleum pipe scale and pipe rattling operations. Accepted for publication in *Health Physics*.
- "Radiation Streaming and Skyshine Assessment for a LLW Assured Isolation Facility," presented June 19, 2002 at the American Radiation Safety Conference and Exposition (Health Physics Society Annual Meeting).
- "Dose and Fluence Analysis of a Dense Plasma Focus Facility at Texas A&M University," presented at the 2001 American Radiation Safety Conference and Exposition (Health Physics Society Annual Meeting).
- Presenter for the South Texas Chapter of the Health Physics Society Science Teacher Workshops. Conducted over 10 8-hour Science Teacher Workshops presenting modules concerning "Fundamentals of Radiation," "Radiation and Everyday Life," "Principles of Health Physics," "Radiological Health," and "Waste Management."
- Recruiter for Texas A&M University Nuclear Engineering Department. Traveled to many high schools throughout Texas speaking to science and math classes about Nuclear Engineering and Radiological Health Engineering.

PROFESSIONAL TRAINING AND COMPUTER CODES

- Qualified user of HG/UF_6 System suite of dispersion/plume codes, IRRAS™ Fault Tree/Event Tree program, Scale/Keno, MCNP, Microshield, and HOTSPOT.
- Trained in Taproot™ incident investigation/root cause determination, Kepner-Tregoe problem solving/incident investigation, Management Oversight Risk Tree (MORT), and Total Quality Management (TQM).
- Possessed DOE "L" security clearance (inactive) and trained as an Authorized Derivative Classifier (inactive).
- Familiar with WordPerfect Office, MSOffice.

MEMBERSHIPS AND HONORS

- Health Physics Society Robert S. Landauer Fellow.
- Department of Energy Office of Civilian Radioactive Waste Management Fellow.
- Eagle Scout.
- Member, American Nuclear Society.
- Member, Health Physics Society.
- Treasurer, North Texas Chapter of the Health Physics Society

7/2004